FINAL REPORT
FOR

REVIEW OF THE CRANSTON PLANT PHASE-DOWN PLAN

Submitted to

CIBA-GEIGY CORPORATION

By

Bechtel National, Inc.
Oak Ridge, TN

July 1985

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Section 1

INTRODUCTION

1.1 Background

Ciba-Geigy Corporation is planning to cease manufacturing operations and decommission the Cranston, Rhode Island plant, which primarily manufactures pharmaceutical chemicals and additives for plastics. Ciba-Geigy has developed a Phase-Down Plan for the plant and has also developed and submitted a RCRA hazardous waste management unit closure plan for the site to the U.S. Environmental Protection Agency (EPA) Region 1 office in Boston, Massachusetts, and the Rhode Island Department of Environmental Management (DEM).

The phase down plan calls for Ciba-Geigy to phase out manufacturing operations and to secure the site by the end of 1985. Ciba-Geigy has received estimates for decommissioning*, equipment removal and demolition activities. These estimates were prepared by cleaning contractors, used equipment contractors, and other contractors experienced in decommissioning manufacturing sites.

Bechtel National, Inc. (hereinafter referred to as Bechtel) submitted this review in response to Ciba-Geigy's request to provide:

- A review of the plant Phase-Down Plan, to comment on the completeness of plan content, and to provide recommendations for plan implementation.
- A proposal to manage the plan implementation and provide completion certification.

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*Those activities performed when: (1) equipment is taken out of service, cleaned, and readied for removal, and (2) the buildings, tanks, and other facility structures receive their final cleaning, are referred to as "decommissioning" in this report.

Ciba-Geigy provided copies of the phase down plan plus the information which had been sent to prospective contractors for the decommissioning and demolition phases of the shutdown. The cost estimates Ciba-Geigy received from these contractors were also sent to Bechtel for preliminary review prior to a team visiting the site.

1.2 Report Format

1.2.1 Overview of the Phase-Down Plan

The primary objective of the Plant Phase-Down Plan is to cease manufacturing operations in a cost-effective, technically sound, and safe manner, consistent with corporate guidelines and in accordance with local, state, and federal regulations and to secure the plant site. In accord with this approach, Bechtel has identified secondary objectives to assist Ciba-Geigy in achieving this goal. These secondary objectives are listed and discussed in Section 3 of this report, together with a structured list of assumptions and overview comments.

1.2.2 Observations and Their Resolution

Bechtel's on-site review of the plant operations provided data for the development of a number of observations concerning the Phase-Down Plan and suggestions for their resolution.

Other items, such as the numbers of contractors to be involved and the possible requirements to have the decommissioning contractor on site during demolition are also included in the discussion of potential areas of concern and suggestions for their resolution.

1.2.3 Suggested Revisions to the Plan and Its Schedule

Suggestions for revisions to the Phase-Down Plan are discussed in Section 5. A schedule for implementation is provided in Section 6. The schedule includes four major steps: Planning, Decommissioning (Phase I), Demolition (Phase II), and Certification.

1.2.4 Quality Assurance Program

Section 7 addresses several aspects of a quality assurance program plan intended to be a guide to requirements for contractor preparation and implementation of important quality control procedures. These procedures provide methods to perform tasks and to complete the necessary documentation during the certification phase.

1.2.5 Safety and Health

Section 8 of this report discusses the Safety and Health planning component and addresses environmental, health, industrial hygiene and safety requirements.

Section 2

EXECUTIVE SUMMARY OF THE CIBA-GEIGY CRANSTON DECOMMISSIONING AND CLOSURE PLAN

2.1 Phase I

After cessation of all production operations the facilities will be thoroughly cleaned with all products generated during cleaning to be disposed of at appropriate CIBA-GEIGY Corporation approved disposal sites.

Portions of the Production Facilities will be dismantled during the cleaning Phase. This action is taken because it is more economically practical to undertake cleaning of heavily contaminated systems through removal than to attempt to clean them in place. These portions to be removed include the industrial fume scrubbing systems, vacuum systems, reactor relief systems and the 1,100 foot long above-ground industrial waste pipe line to the CIBA-GEIGY Corporation Waste Water Treatment Plant. In addition, all insulation which contains asbestos will be removed. The net result of these actions is that the Production Facilities will become a shell with equipment but will be devoid of systems essential for continued operation as a chemical plant.

2.2 Phase II

The usable equipment will be sold and the Production Facilities will be demolished.

The facilities which constitute the production portion (3 acres) of the plant will be demolished and the site left clear of any structures. Included in the demolition are auxiliary facilities such as liquid raw material and intermediate storage tank farms, distillation columns, cooling water recovery system, waste stream separation units (sumps, dissolved air flotation system,

holding tanks), the steam plant and office Building 14. The resulting clear area will constitute all the Cranston property south of the railroad tracks, plus the area previously occupied by the underground storage tanks. The removal of these tanks is included in the demolition.

The remaining portions of the Cranston Plant consist of five different sections:

- The Cranston Bellefont Property, which is free of any structures (22.4 acres).
- The Cranston Property north of the railroad tracks on which is located the Warehouse and Laboratory Buildings (3.8 acres).
- The Warwick Property, on which is located the Locker Room, Cafeteria and Maintenance Buildings (27.5 acres).
- A separate Cranston Property on which is located the CIBA-GEIGY Corporation Waste Water Treatment Plant (5.8 acres).
- Six residential homes in Cranston, adjacent to the former underground tank farm area and the Warehouse Building.

2.3 Cleaning of the Production Facilities

The Plant Production related facilities will require initial cleaning after production ceases to insure that the Phase II activities can be undertaken in a safe and environmentally responsible manner.

2.3.1 Initial Cleaning

An initial two week duration cleaning will be performed by CIBA-GEIGY Corporation employees as follows:

- The plant production manufacturing equipment (i.e., reactors, receivers, centrifuges, dryers, in-building holding and storage tanks, etc.) will be emptied and boiled out. Floors and walls will be cleaned with steam and hot water.

- Outside storage tanks, i.e., all those used as production intermediate holding tanks (Building 21 tank farm, tank farm over-the-river, quarantine tanks, and distillation column feed tanks) and all liquid raw material storage tanks will be drained down as far as possible.

- Industrial fume scrubbers and concentrated fume scrubbers will be drained as much as possible.

- The Building 24 zinc facility will be cleaned to remove gross amounts of zinc sludge.

- The storage tanks and clarifier at the CIBA-GEIGY Corporation Waste Water Treatment Plant will be drained.

- The cooling system will be drained as much as possible. Neither the hot nor cold wells will be pumped out.

- As much as possible all process piping systems interconnecting pieces of process equipment will be flushed out.

- The waste chlorinated solvent holding tanks T-1 and 022 will contain hazardous waste.

- All drums, bags, cans and other containers of liquid and solid raw materials will be removed from the Plant site. The hazardous drum storage area will contain the drums.

2.3.2 Final Cleaning

The final cleaning will be accomplished by a contractor. The cleaning plan will be as follows:

- The equipment and pipe line insulation which contains asbestos will be removed before any other action is taken. Removal and disposal will be done in accordance with OSHA, EPA and State requirements.

- The three plant facilities for storing hazardous waste (a 6,000 gallon tank [T-1], an 8,000 gallon tank [022] and the drum holding area) will be emptied and cleaned following procedures as approved in the RCRA Part V Permit Application. The materials from these areas will be disposed of at a secure EPA licensed incinerator or landfill. This will be accomplished within the first two months of the contract.

- o The plant cooling tower system will be shutdown, drained to the Pawtuxet River and cleaned immediately after cessation of production in accord with the plant's NPDES Permit.

- o The systems used in the Production areas which are not economical nor practical to attempt to clean in place will be dismantled and then either cleaned in sections or, if heavily coated or plugged, disposed of in drums at a secure landfill. These systems are:

  - General Process Fume Scrubbing Systems
  - Concentrated Process Fume Scrubbing Systems
  - Vacuum Systems
  - Reactor Rupture Relief Systems
  - The Industrial Waste Water Pipe Line to the CIBA-GEIGY Corporation Treatment Plant (removal will be at the end of the Cleaning Phase)

- o The Production Facilities in Building 21 which have been used in the Zinc Reduction processes will be cleaned by utilizing the existing zinc filtration systems. After cleaning of the Building 21 zinc contaminated equipment and structure surfaces, the zinc filtration Building 24 with all equipment, piping, scrubbing system, etc., will be demolished and the material disposed of at a secure landfill site.

- o Liquid raw materials will be consumed as much as possible prior to the cessation of production. The remaining heel in each tank will be emptied and the tanks and transfer lines cleaned. The residual chemicals will either by used by the cleaning contractor (solvents) or will be discharged through the existing Waste Water Treatment Plant in accord with the approved discharge permit or hauled away for approved treatment or disposal.

The discharge from the Waste Water Treatment Plant will be performed by the contractor, but will be maintained, monitored and controlled by CIBA-GEIGY Corporation personnel to assure compliance with the Plant Discharge Limits.

A pretreatment plant will be used to minimize the amount and concentration of physical and chemical contamination including Priority Pollutants prior to reaching the CIBA-GEIGY Corporation Waste Water Treatment Plant holding tanks. The effluent from the cleaning operations will be collected in an

existing sump, pumped through sand bed filters followed by activated carbon filters, and then directed back into the waste water system. In this manner, chemical materials will be removed from the cleaning solutions (which will be chiefly water) and the Flow, BOD, Suspended Solid and Chemical Pollutant Loadings will be significantly reduced. Analysis and final control will be under the direction of CIBA-GEIGY Corporation personnel. The wastes collected from the sand and activated carbon filtration systems will be analyzed by CIBA-GEIGY Corporation personnel and will be disposed of at appropriate sites.

There is presently fuel oil held in reserve to serve the existing steam generating plant. After completion of the cleaning of the buildings, this fuel oil will be sold and the tanks cleaned.

A 1,000 gallon underground gasoline storage tank will be emptied and cleaned.

There are five (5) different areas within the plant where sludge from the process operations has accumulated. These are:

- Industrial Waste Floor Drain Traps
- Building Sumps (Six Total)
- Raw Waste Sump
- Equalization Storage Tanks (Three Total)
- Clarifier Sludge Holding Tank

Each area will be sampled, analyzed and depending upon the material composition will be either disposed of through the CIBA-GEIGY Corporation Waste Water Treatment Plant or disposed of at a secure treatment or landfill site.

The distillation columns and associated feed tanks will be cleaned. The bottom sludges and solids from the waste streams which presently discharge to the dissolved air flotation (DAF) system will be disposed of as hazardous waste. The clean up of the DAF will be accomplished using a solvent solution. This waste will be disposed of as hazardous waste.

There are five (5) transformer substations and eight (8) electrical capacitors which contain levels of PCB which prohibit reuse or resale under Federal Regulations. The transformers and capacitors will be removed from the plant site, detoxified (including PCB incineration) at an approved site and the transformer materials melted for recovery of usable materials.

The decontamination and disposal of the fluids containing PCB's will be accomplished at different times during the demolition phase, since some of the transformers and capacitors will be in service during the equipment removal, particularly for elevator operation.

The ammonia and glycol refrigeration systems will be cleaned and the material disposed of as hazardous waste.

The Plant hydraulic pumping systems (which are not PCB contaminated) will be cleaned and the hydraulic oil disposed of as hazardous waste.

Upon completion of the cleaning, a written affidavit will be issued by the Constructor affirming that the Plant Facilities have been cleaned, and the degree of cleaning levels achieved. Included will be a record of what materials have been disposed of and the disposal sites used.

2.4 Other Activities Associated with Phase I Cleaning

2.4.1 Fencing

At present 7,760 feet of fencing is installed around portions of the CIBA-GEIGY Corporation property where security and isolations have been required during operation of the Plant. The entire CIBA-GEIGY Corporation

owned property will be fenced, including 2,396 feet along the Pawtuxet River on both the Cranston and Warwick sides, to discourage entrance by unauthorized persons.

2.4.2 Personnel

CIBA-GEIGY Corporation personnel will be assigned to manage the cleaning phase and will include a General Manager, a Site Superintendent, Maintenance Superintendent, and General/Effluent Waste Water Treatment Superintendent.

The duties of these personnel are:

General Manager - responsible for total decommissioning plan.

Site Superintendent - responsible to manager and oversee all cleaning and demolition of the facilities (primarily oversees day-to-day operations and security of total facility).

Superintendent of Maintenance - responsible for knowledge of all equipment, water and sewer systems, fire protection systems, general overall construction and to be available for answering questions about the facility.

General/Effluent Waste Treatment Superintendent - responsible for any general plant items, hazardous waste follow-up and waste treatment facility.

2.4.3 Independent Third-Party Verification

A contractor experienced in decommissioning manufacturing sites will conduct sampling and analyses during the wash-down phase to determine the level of cleanliness achieved. This is necessary to ensure that there will be no contamination left on equipment which will be sold or on materials which will become debris during demolition and will be disposed of in a local sanitary landfill. For verification that the materials are free from possible future liability, it is planned to perform third-party independent sampling, and analyses and certification.

2.4.4 City of Cranston Wastewater Tie-In Agreement

Wastewater from cleaning operations will be collected at the source and passed through sand filters and an activated carbon bed to remove solid and dissolved priority pollutants prior to discharge to CIBA-GEIGY Corporation Wastewater Treatment Plant. The wastewater will be collected and discharged in conformance with the Tie-In Agreement between the City of Cranston and CIBA-GEIGY Corporation. Cost for treatment will be significantly reduced compared with normal operations since 85% of the cost burden is due to BOD loading which will be minimal compared with the volume of water generated.

Section 3

REVIEW OF EXECUTIVE SUMMARY

The Cranston Plant Phase-Down Plan is well developed. It is also ambitious and will require careful and thorough planning and controls to meet the scheduled milestones and time limitations. The hazardous waste management unit closure plan included in the Phase-Down Plan meets established regulatory agency requirements and is workable in the desired time frame.

On-site inspection has led to the realization that it will probably not be possible to complete all facility and equipment cleaning operations prior to commencement of equipment removal. Ciba-Geigy intends to continue to operate its on-site wastewater pretreatment system until the decommissioning phase is completed. Ciba-Geigy currently plans to remove:

- All excess raw materials
- All process wastes

prior to the inception of decommissioning. Bechtel's review of the Phase-Down Plan together with the assumptions made by Ciba-Geigy (which provide the basis for the Plan) indicates the primary and secondary objectives can be met within the confines of the schedule contained in this report. Accomplishing these objectives will result in a certification that the plant has been decommissioned, the equipment has been cleaned and removed, and the site topography has been restored in accord with applicable federal, state and local statutes including any closure requirements resulting from 1984 amendments to the Resource Conservation and Recovery Act (RCRA).

3.1 Assumptions

The following assumptions have been made:

- o There have been no releases of hazardous materials from above ground or underground pipes or tanks containing solvents, feedstocks, gasoline, or waste materials.
- o There has been a record of the existence of:
  - Coffee grounds and possibly a carbon residue removed during later construction with no known environmental impact.
  - A toluene leak in 1983 which was contained and cleaned up, with no consequential environmental impacts
  - Calcium sulfate disposal in the ground with subsequent removal during later construction and with no known environmental impact.
  - Silt from river dredging which was removed in 1976 with no known environmental impact.
  - Toluene in ground water in the vicinity of Building 11 (since demolished). Subsequent sampling did not show detectable levels of toluene.
- o All buildings including floors and walls will be cleaned by December 1985, except for Building 24 and Building 21's first floor.
- o All existing equipment will have been cleaned by boil-out (or other suitable methods) by Ciba-Geigy personnel.
- o Water and detergent/steam will usually be sufficient for equipment cleaning after any neutralization required; occasionally, solvent may be required.
- o The plant fire protection system will continue to be operative while the decommissioning contractor is working.
- o The quantity of on-site asbestos is being determined by Ciba-Geigy. A budgetary estimate has been used for purposes of this plan.
- o Cooling tower water will be emptied in accordance with the plant's NPDES permit.

3.2 Description of Steps

Implementation of the phase-down plan has been separated into four steps for ease of review. The components are:

3.2.1 Planning

During this step, the decommissioning and demolition program details will be planned. This will include confirmation of scope, approval of procedures, finalization of contract packages, establishment of budgets and schedules, and mobilization of management and technical personnel.

3.2.2 Decommissioning (Phase I)

The decommissioning step covers a 10- to 11-month period when the contractor must remove the materials, residues, and wastes described in the closure plan with suitable disposal of hazardous wastes. All testing, handling, and disposal activities involving these materials will be carefully documented. The decommissioning contractor will also clean and prepare on-site equipment or structures for removal or demolition. The decommissioning contractor will demolish Building 24 and the equipment contained therein, and will dispose of the contents and structure at a Ciba-Geigy approved hazardous waste disposal site licensed by EPA.

The decommissioning contractor will be required to continue to work on-site as new areas of the plant or structures which may require additional cleaning are exposed during equipment removal by the demolition contractor.

3.2.3 Demolition (Phase II)

This step covers a 13-month period during which plant equipment, materials, and fixtures will be removed by a contractor and disposed of in an environmentally sound manner specified by Ciba-Geigy. The buildings will then be demolished and the rubble disposed at a landfill approved by Ciba-Geigy.

Contractors who have discussed this step with Ciba-Geigy expect the plant and equipment to be free of any hazardous wastes or uncleaned materials at the inception of this work.

3.2.4 Certification

This step will be the culmination of more than two years' work. All required documentation will be assembled and transmitted to the appropriate regulatory agencies. The files containing sampling records, chemical analyses, chain-of-custody documentation, site monitoring records, and the certification of a local professional engineer attesting to the proper management of hazardous and non-hazardous materials will be part of this submission to the EPA and the DEM, along with the application for certification that the plant has been closed. A complete file of documents will also be retained by Ciba-Geigy.

3.3 Objectives

3.3.1 Primary Objectives

The primary objective of Ciba-Geigy is to decommission the plant in a cost-effective, environmentally sound and safe manner in accordance with local, state, and federal laws.

There are secondary objectives in each of the steps. Successful attainment of the secondary objectives will help ensure timely certification of total plant decommissioning. These secondary objectives may also serve as a checklist of action items to be performed during phase-down in order to develop documentation for the certification process. These items are related to decisions which are the responsibility of Ciba-Geigy Corporation.

3.3.2 Secondary Objectives

3.3.2.1 Planning Step

- Establish certification requirements and a plan to meet and document these requirements. Establish a record of all regulatory agency interactions and a monitoring plan to record any discharges and emissions during decommissioning and demolition.

- Establish a plan for maintaining effective relations with the community.

- Make decisions regarding scope of work and responsibility for the various parties. Complete subcontract plan and establish subcontractor control mechanisms and subcontractor industrial health and safety permitting requirements based on Ciba-Geigy's existing requirements, experience, and appropriate health and safety checks.

- Establish a plan to ensure that the Ciba-Geigy scope of work is completed prior to turnover of the plant to a decommissioning contractor. Finalize decisions on Ciba-Geigy equipment available for other Ciba-Geigy operations.

- Finalize site configuration at completion of phase-down project.

- Establish a basis for assuring adequate cleanliness is achieved during decommissioning through decision making on alternative cleaning methods, and restrictions on resale of equipment removed.

3.3.2.2 Decommissioning Step (Phase I)

- Ensure completion of scope of work step.

- Ensure that all certification requirements are current and up-to-date.

- Establish conformance with disposal requirements for equipment and structural components of Building 24.

- Monitor compliance with technical specifications for decommissioning.

- Establish test result correlations between methods used to clean equipment, level of cleanliness achieved, and guidelines for choosing potential recipients.

- Monitor subcontractors to ensure compliance with fire safety and industrial hygiene/safety rules and regulations.

- o Monitor compliance with certification documentation procedures and requirements.

- o Monitor and control any discharges or emissions and assure compliance with Cranston, EPA and DEM regulations.

3.3.2.3 Demolition Step (Phase II)

- o Perform subcontract monitoring to ensure compliance with:
  - Technical specifications.
  - EPA and DEM regulations, Ciba-Geigy permitting requirements for fire safety and industrial hygiene/safety rules, and training requirements for asbestos removal.
  - Certification documentation procedures and requirements.
- o Ensure that up-to-date knowledge is maintained about certification requirements and that they are being fulfilled.
- o Manage multiple contractors to minimize work schedule conflict.
- o Ensure appropriate site restoration/configuration at completion.

3.3.2.4 Certification Step

- o Compile all documentation regarding certification. Arrange for review by a State of Rhode Island professional engineer for sign-off. The documentation must demonstrate that:
  - No releases to air, surface water, ground water, soil or sediments have occurred or that control has been maintained over any releases which did occur.
  - Suitable disposal has been made of all materials removed from site.
  - The final site topography has been established.

3.4 Technical Overview Comments

3.4.1 Contractor Procedures

Bechtel recommends a review of the contractors' proposed procedures for:

- o Cleaning
- o Zinc decontamination
- o Spill prevention
- o Activity sequencing
- o Handling of underground pipes and tanks
- o Asbestos removal
- o Cleanup of any contaminated soil
- o Materials handling
- o Waste disposal

Bechtel will provide review comments on the procedures or plans formulated when these detailed procedures are available.

3.4.2 Hazardous Wastes

The existing hazardous waste management unit closure plan suitably addresses the EPA requirements for hazardous waste handling and disposal which existed as of November 1, 1984. Additional EPA requirements are currently in regulatory formulation and review because of recent changes in the law. These are expected to address several additional topical areas, including certification that:

- o No leaks have occurred from underground fuel or chemical storage tanks.
- o Prior discharges, spills, and emissions have been satisfactorily controlled.

- All on-site "solid waste management units"* will be addressed in a final closure plan submission.

Ciba-Geigy should seek to achieve a final agreement with EPA Region 1 and with DEM on the certifications that will be required and the format that will be acceptable. This can be a part of the plant's RCRA hazardous waste storage permit currently being developed.

All of the comments made above in Section 3.4.1 which pertain to review of detailed plans, procedures, health and safety requirements, controls of spills and leaks, and waste disposal are particularly relevant to the management of hazardous wastes.

*This term is currently being defined by EPA. According to Mr. Ira Leighton of EPA Region 1, the definition should be completed soon.

Section 4

OBSERVATIONS AND RECOMMENDATIONS FOR CONSIDERATION

This section highlights observations on potential concerns noted during the review of the plant phase-down and hazardous waste management unit closure plan, preliminary bid documents, contractor responses, and the discussions held as part of the on-site visit. Resolution of these potential concerns will depend on management decisions made by Ciba-Geigy as well as on the changing regulatory requirements resulting from the 1984 amendments to RCRA.

The observations, potential concerns, and suggested resolutions are presented herein by step. The items stated are indicative of situations encountered on previous projects or which may be reasonably anticipated at the Cranston plant.

4.1 Planning Step

- Identification must be made of all objectives and decisions as to how, by whom, and when they are to be met. A systematic review of the plan, reasons for closure, current and past operations, and future expectations will assist Ciba-Geigy in assuring there will be "no surprises" when the request for certification is presented.

- The magnitude of the phase-down project must be emphasized. The Planning Phase objectives (outlined in Section 3.3) need to be met and the Planning Phase activities (outlined in Section 3.2) need to be completed while continuing to fulfill current Ciba-Geigy operational commitments. Ciba-Geigy intends to use outside services where required.

  Ciba-Geigy staffing requirements will change; the changes will result in a different mix of talents than those currently employed at the plant.

- Determination and confirmation of the total scope of work to be performed must be completed to gain certification. Regulations are changing; Ciba-Geigy may be required to perform closure activities in compliance with applicable requirements as of the date of submission of closure certification. This can be accomplished by assuring that the project is kept abreast of legislation or promulgated regulatory requirements.

Resolution of the scope of work packages (relating to elements of work and whose responsibility it is to accomplish each) is advisable. Bechtel suggests the following services/contracts are appropriate to implement the plan:

- Ciba-Geigy in-house personnel performing "boil-out", warehouse draw-down, cleaning, sludge removal, support services, and similar activities.
- A management team to manage all the contractors and to document performance.
- Cleaning and other decommissioning activities
- Used equipment removal, demolition
- Security
- Fencing
- Independent sampling and chemical analysis laboratory
- Professional services of a registered engineer
- Substation and other electrical equipment removal (PCB disposal)
- Treatment plant operation during cleaning and decommissioning if not operated by Ciba-Geigy in-house personnel
- Boiler plant, or contractor alternative
- Tank farm removal
- Transport and disposal of hazardous waste

Selective contracting with specialty firms will assure that qualified contractors will perform the various tasks.

During the Planning step, suitable contract packages need to be prepared for each selected scope with control mechanisms designed to assure successful contract administration. The bidding documents should contain:

- Invitation to bid
- Instructions to bidders
- Contract (draft form)
- General conditions

- Special conditions
- Scope of work definition (drawings)
- Technical specifications
- Schedule of prices (to be completed by the bidder)
- Schedule for performance of the work

The bid package formulation, bidding, and evaluation stages should be accomplished by personnel with technical and commercial experience in the operations/maintenance/construction fields. This will markedly assist in avoiding or minimizing schedule and/or cost overruns. The establishment, early in the planning step, of a comprehensive control mechanism supported by an effective management information system, is a cost-effective means to maintain control. The project schedule, detailed contractor schedule, and budgets form the data base from which progress can be monitored.

Ciba-Geigy should be prepared to state (i.e., certify) that no releases to the environment have occurred or that there is no imminent danger to human health or the environment resulting from activities at the Ciba-Geigy Cranston Plant.

4.2 Decommissioning Step (Phase I)

- o A main concern here is the determination of adequate cleanliness to satisfy Ciba-Geigy, the regulatory agencies, and the demolition contractor. Performance specifications must be prepared and enforced. An independent laboratory must make impartial tests and analyses. Several laboratories in the Providence-Boston area are available.
- o A thorough review of the Ciba-Geigy equipment cleaning process should be performed prior to turnover to the cleaning contractor. A protocol review will ensure agreement on the conditions that exist at the time the cleaning contractor commences work.
- o The nature of the cleaning requirements and the difficulty of access to all areas and spaces of the plant make it unrealistic to believe the plant will be "cleaned" during one pass-through. There will be a need for cleaning activities during demolition. This must be included in the scope of work of the cleaning contractor. It will also be necessary to recognize the schedule and cost impact aspects of the additional cleaning needs.

4.3 Demolition Step (Phase II)

- Identification of what has successfully been cleaned must be provided. This can be confirmed by having an independent laboratory test the materials to be handled by the demolition contractor. Determination must be timely to prevent delays during demolition.

- Restrictions on where materials/equipment may be disposed must be specified. Certain items which will become property of the contractor may not be suitable for all applications.

- Schedule compression will be required to keep the total time frame to two years. This is best attained by close management of the contractors to assure that work proceeds on a timely schedule.

4.4 Certification Step

- The main concern is accumulation of the proper documentation during implementation of the plan with appropriate signatures of witnesses as required at critical points in the project. This is best accomplished by having knowledgeable personnel, familiar with documentation requirements, on site and monitoring the contractors in accordance with the quality assurance/quality control plan and procedures. Timely preparation of the reports and forms will facilitate assembly of the certification package and preclude the necessity of recovering records at a later date.

Section 5

REVISIONS TO THE PHASE-DOWN PLAN

During the Bechtel review process it became apparent that Ciba-Geigy has made, or will make revisions to the Phase-Down Plan. Decisions must be made by Ciba-Geigy at the earliest possible date to avoid impacts to any of the planned phases.

- The Phase-Down Plan should be reconfigured to:
  - Allow for overlap of decommissioning, demolition, and certification.
- The closure plan indicates hazardous waste is to be loaded and shipped to an EPA permitted disposal site.
- The Phase-Down Plan focuses primarily on the cleaning and possible demolition phases of the project. The total project must be addressed, however, and a comprehensive fully integrated plan and schedule prepared. This approach is the over riding theme of Bechtel's review and is the basis of the revised schedule and the new budget which are presented elsewhere in this report.

The observations concerning the Plan stated in Sections 3 and 4 will be reflected in the Final Phase-Down Plan and are not repeated here.

Section 6

SCHEDULE

The total duration of the Phase Down Plan is considered to be 23 months with the project schedule divided into four steps.

1 Planning

2 Decommissioning (Phase I)

3 Demolition (Phase II)

4 Certification

- The Planning Step covers a period of 2 months, during which the scope of work will be defined, and a detailed Phase Down Plan Schedule will be developed. Subcontract packages will be formulated, reviewed, issued and awarded.
- The Decommissioning Step (Phase I) covers a period of 11 months. The decontamination subcontractor will clean all required pipings, systems, equipment and all structures below and above ground, and will transport and dispose of all hazardous waste.
- The Demolition Step (Phase II) covers a period of 13 months. The demolition subcontractor will remove equipment, piping, mechanical and electrical systems, demolish all manufacturing buildings, transport and dispose of all non-hazardous waste and complete the restoration of the site. The ground water monitoring program will be initiated at the end of this Phase.
- The Certification Step covers a period of 2 months. A final investigation of the site will be performed for certification and release.

Schedule I depicts the activities to be performed for the phase down of the plant. Each activity is time phased based on an early start and early finish, with total float time.

Schedule II lists in a tabular form all the activities with a duration for completion based on an early start and early finish, late start and late finish with a total float time.

Schedule III shows a network logic representation for the critical path.

SCHEDULE I

CIBA GEIGY — PRIMAVERA PROJECT PLANNER — CIBA GEIGY DECOMMISSIONING PROJECT

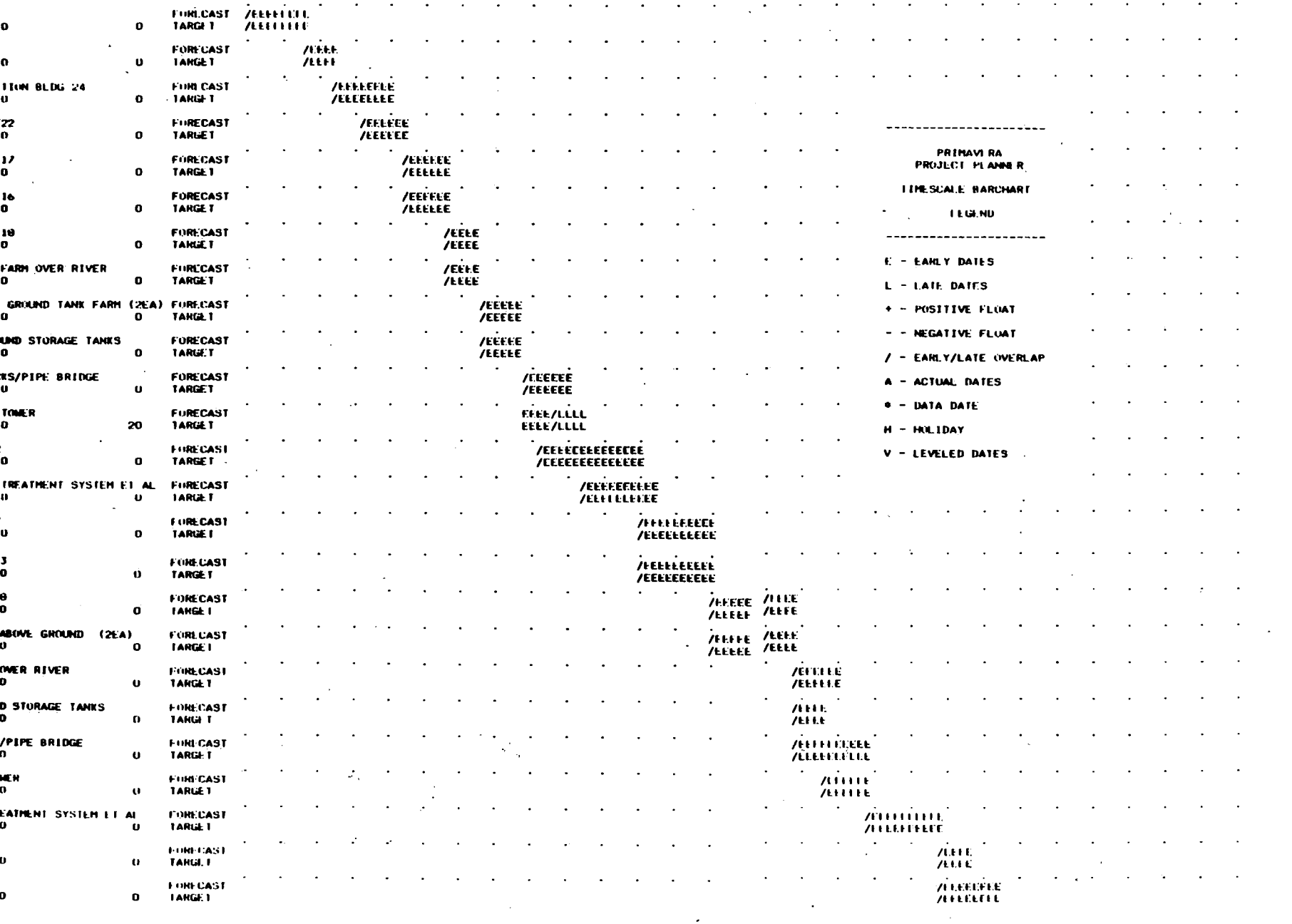
REPORT DATE 2*MAR95 RUN NO. 16 — CIBA GEIGY FACILITY DECOMMISSIONING PROJECT — START DATE 2DEC05 FIN DATE

BECHTEL NATIONAL INC BAR 1 — DATA DATE 2DEC05 PAGE NO. 1

WEEKLY TIME-TEN 1

ACTIVITY NO	ACTIVITY DESCRIPTION	OD	RD	PCT	CODES	FLOAT	SCHEDULE
	PLANNING						FORECAST
10		40	40	0		0	TARGET
	MOBILIZATION						FORECAST
21		21	21	0		0	TARGET
	DECOMMISSIONING & DEMOLITION BLDG 24						FORECAST
22		40	40	0		0	TARGET
	DECOMMISSIONING BLDG 21/22						FORECAST
23		30	30	0		0	TARGET
	DECOMMISSIONING BLDG 19/17						FORECAST
24		30	30	0		0	TARGET
	DECOMMISSIONING BLDG 23/16						FORECAST
25		30	30	0		0	TARGET
	DECOMMISSIONING BLDG 10/18						FORECAST
26		20	20	0		0	TARGET
	DECOMMISSIONING OF TANK FARM OVER RIVER						FORECAST
27		20	20	0		0	TARGET
	DECOMMISSIONING OF ABOVE GROUND TANK FARM (2EA)						FORECAST
28		30	30	0		0	TARGET
	DECOMMISSIONING UNDERGROUND STORAGE TANKS						FORECAST
29		30	30	0		0	TARGET
	DECOMMISSIONING DAF/STACKS/PIPE BRIDGE						FORECAST
30		30	30	0		0	TARGET
	DECOMMISSIONING COOLING TOWER						FORECAST
31		20	20	0		20	TARGET
	DEMOLITION OF BLDG 21/22						FORECAST
40		70	70	0		0	TARGET
	DECOMMISSIONING BLDG 27/TREATMENT SYSTEM ET AL						FORECAST
32		50	50	0		0	TARGET
	DEMOLITION OF BLDG 19/17						FORECAST
41		50	50	0		0	TARGET
	DEMOLITION OF BLDGS 16/23						FORECAST
42		50	50	0		0	TARGET
	DEMOLITION OF BLDGS 10/18						FORECAST
43		40	40	0		0	TARGET
	DEMOLITION OF TANK FARM ABOVE GROUND (2EA)						FORECAST
45		40	40	0		0	TARGET
	DEMOLITION OF TANK FARM OVER RIVER						FORECAST
44		30	30	0		0	TARGET
	DEMOLITION OF UNDERGROUND STORAGE TANKS						FORECAST
46		20	20	0		0	TARGET
	DEMOLITION OF DAF/STACKS/PIPE BRIDGE						FORECAST
47		50	50	0		0	TARGET
	DEMOLITION OF COOLING TOWER						FORECAST
48		30	30	0		0	TARGET
	DEMOLITION OF BLDG 27/TREATMENT SYSTEM ET AL						FORECAST
49		50	50	0		0	TARGET
	RESTORATION						FORECAST
50		20	20	0		0	TARGET
	CERTIFICATION						FORECAST
60		40	40	0		0	TARGET

10JAN86 21APR86 30JUN86 08SEP86 17NOV86 26JAN87 13APR87 08JUN87 17AUG87 26OCT87 04JAN88 14MAR88 23MAY88



PRIMAVERA
PROJECT PLANNER

TIMESCALE BARCHART

LEGEND

E - EARLY DATES

L - LATE DATES

\+ - POSITIVE FLOAT

\- - NEGATIVE FLOAT

/ - EARLY/LATE OVERLAP

A - ACTUAL DATES

* - DATA DATE

H - HOLIDAY

V - LEVELED DATES

[redacted] SCH[redacted]LE

CIBA GEIGY PRIMAVERA PROJECT PLANNER CIBA GEIGY DECOMMISSIONING PROJECT

REPORT DATE 29MAR85 RUN NO. 13 CIBA GEIGY FACILITY DECOMMISSIONING PROJECT START DATE 2DEC85 FIN DATE

SR01 Demo Sched Rep - Sorted by ES, TF DATA DATE 2DEC85 PAGE NO. 1

ACTIVITY NUMBER	ORIG DUR	REM DUR	PCT	CODE	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	LATE START	LATE FINISH	TOTAL FLOAT
10	40	40	0		PLANNING	2DEC85	27JAN86	2DEC85	27JAN86	0
21	21	21	0		MOBILIZATION	28JAN86	26FEB86	28JAN86	26FEB86	0
22	40	40	0		DECOMMISSIONING & DEMOLITION BLDG 24	27FEB86	23APR86	27FEB86	23APR86	0
23	30	30	0		DECOMMISSIONING BLDG 21/22	27MAR86	7MAY86	27MAR86	7MAY86	0
24	30	30	0		DECOMMISSIONING BLDG 19/17	8MAY86	19JUN86	8MAY86	19JUN86	0
25	30	30	0		DECOMMISSIONING BLDG 23/16	8MAY86	19JUN86	8MAY86	19JUN86	0
26	20	20	0		DECOMMISSIONING BLDG 10/18	20JUN86	18JUL86	20JUN86	18JUL86	0
27	20	20	0		DECOMMISSIONING OF TANK FARM OVER RIVER	20JUN86	18JUL86	20JUN86	18JUL86	0
28	30	30	0		DECOMMISSIONING OF ABOVE GROUND TANK FARM (2EA)	21JUL86	29AUG86	21JUL86	29AUG86	0
29	30	30	0		DECOMMISSIONING UNDERGROUND STORAGE TANKS	21JUL86	29AUG86	21JUL86	29AUG86	0
30	30	30	0		DECOMMISSIONING DAF/STACKS/PIPE BRIDGE	1SEP86	13OCT86	1SEP86	13OCT86	0
31	20	20	0		DECOMMISSIONING COOLING TOWER	1SEP86	29SEP86	30SEP86	27OCT86	20
40	70	70	0		DEMOLITION OF BLDG 21/22	16SEP86	23DEC86	16SEP86	23DEC86	0
32	50	50	0		DECOMMISSIONING BLDG 27/TREATMENT SYSTEM ET AL	28OCT86	7JAN87	28OCT86	7JAN87	0
41	50	50	0		DEMOLITION OF BLDG 19/17	24DEC86	4MAR87	24DEC86	4MAR87	0
42	50	50	0		DEMOLITION OF BLDGS 16/23	24DEC86	4MAR87	24DEC86	4MAR87	0
43	40	40	0		DEMOLITION OF BLDGS 10/18	5MAR87	29APR87	5MAR87	29APR87	0
45	40	40	0		DEMOLITION OF TANK FARM ABOVE GROUND (2EA)	5MAR87	29APR87	5MAR87	29APR87	0
44	30	30	0		DEMOLITION OF TANK FARM OVER RIVER	30APR87	10JUN87	30APR87	10JUN87	0
46	20	20	0		DEMOLITION OF UNDERGROUND STORAGE TANKS	30APR87	27MAY87	30APR87	27MAY87	0
47	50	50	0		DEMOLITION OF DAF/STACKS/PIPE BRIDGE	30APR87	8JUL87	30APR87	8JUL87	0
48	30	30	0		DEMOLITION OF COOLING TOWER	28MAY87	8JUL87	28MAY87	8JUL87	0
49	50	50	0		DEMOLITION OF BLDG 27/TREATMENT SYSTEM ET AL	9JUL87	16SEP87	9JUL87	16SEP87	0
50	20	20	0		RESTORATION	17SEP87	14OCT87	17SEP87	14OCT87	0
60	40	40	0		CERTIFICATION	17SEP87	11NOV87	17SEP87	11NOV87	0

SCHEDULE III

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CIBA GEIGY                          PRIMAVERA PROJECT PLANNER          CIBA GEIGY DECOMMISSIONING PROJECT
REPORT DATE 2*MAR85  RUN NO.  14      NETWORK PATH ANALYSIS            START DATE  2DEC85 FIN DATE
NL01 Demo Network Logic Rep for Critical Path                          DATA DATE  2DEC85   PAGE NO.    1
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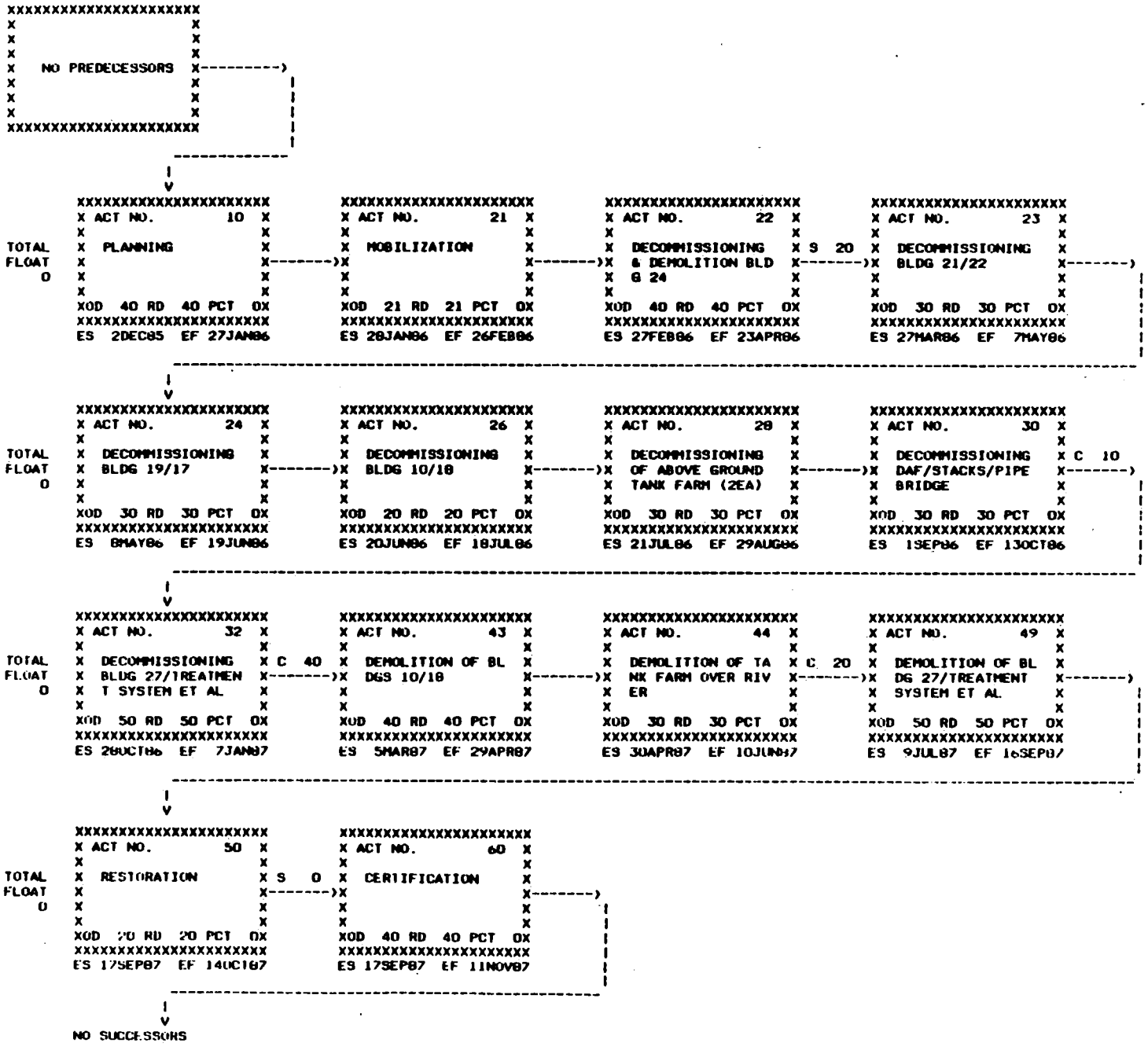

Section 7

PROPOSED QUALITY ASSURANCE PROGRAM COMPONENTS

7.1 Purpose

The purpose of this section is to establish the Quality Assurance/Quality Control requirements for the decommissioning of the Ciba-Geigy, Cranston Plant.

7.2 Scope

The requirements defined herein apply to Contractor/Subcontractor organizations performing activities related to the decommissioning of the Ciba-Geigy Cranston Plant. The Quality Assurance program includes Quality Control of site activities performed by Subcontractors.

7.3 Objective

The objective of the Quality Assurance Program is to ensure that the activities for all project phases are performed in a controlled cost effective manner, and that appropriate documentation is maintained to verify the success of the decontamination and decommissioning effort.

7.4 Contractor/Subcontractor Basic Requirements

7.4.1 Organization

Each contractor organization shall define the organizational structure within which the Quality Assurance Program is to be planned and implemented. The organizational description shall clearly delineate the responsibilities and authority of the various personnel and organizations involved. The person responsible for the formulation and direction of the Quality Assurance Program

shall have direct access to management at a level where appropriate action can be initiated when required and shall report regularly on the effectiveness of the program. Persons and organizations performing Quality Assurance functions shall have sufficient authority and organizational freedom to verify conformance to quality requirements, identify and report quality problems, and initiate, recommend or provide solutions, as appropriate, through designated channels.

7.4.2 Quality Assurance Program Plan

Upon commencement of the project, the Contractor/Subcontractors shall develop and implement a quality assurance program plan for their activities in accordance with the requirements defined herein. This quality assurance program plan is subject to approval by Ciba-Geigy. Subcontractor Quality Assurance plans shall be approved by the Phase-Down Manager.

The Quality Assurance Program recognizes that the line organization is responsible for achieving and assuring the desired quality, reliability, and safety of its activities. These requirements provide for formal controls that will be integrated within the normal management practices of the project line organizations to provide a high degree of confidence that the goals of the project will be achieved as planned.

7.5 Contractor/Subcontractor Requirements for Control of Quality

7.5.1 Task Control

Procedures for performance and control of work shall be prepared by the line organization responsible for the work prior to start of work. Procedures shall be approved by appropriate management and reviewed by Quality Assurance personnel for conformance to the Quality Assurance Program requirements. The Quality Assurance Program plan and Implementing Procedures shall address the following:

- Health and Safety
- Sample Control and Custody

- Calibration Control of Measuring and Test Equipment
- Procurement Control
- Document Control
- Identification and Control of Material and Wastes
- Inspection Control and Documentation
- Test Control and Documentation
- Nonconformance Control
- Handling, Storage, Shipping and Disposal of Wastes and Used Equipment
- Data and Records Management
- Indoctrination and Training
- Audits
- Corrective Action

Section 8

HEALTH AND SAFETY

It is Bechtel's understanding that Ciba-Geigy intends to require all on-site contractors continuously comply with existing Ciba-Geigy requirements which address:

- Fire Safety
- Industrial Hygiene
- Industrial Safety
- Environmental Standards

and that the existing fire protection system will be maintained through the decommissioning phase. In addition to these requirements, the decommissioning contractor will have to establish and use suitable sanitary facilities and post-cleaning activity personnel decontamination facilities (i.e., equipment and clothing wash down facilities and washwater catchment tanks). Since some of the materials to be removed from the plant (e.g., polyurethane foam insulation coated with production chemical residues) may present an unusual fire hazard in staging areas after removal from buildings, additional fire safety protocols will need to be established.

Additional staging areas for hazardous waste storage (e.g., those created during Building 24 demolition) may also be needed.

Ciba-Geigy may wish to require that contractor-provided training sessions be given after content review by Ciba-Geigy, and with a Ciba-Geigy presence during the training session.